2 X 100Watt Class-D Audio Amplifier - TK2050 User's Guide

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2 X 100Watt Class-D Audio Amplifier - TK2050

To keep the product in a best working condition and having a long service time, please operate it according to the relevant steps. The warranty lapses if the product is damaged because of incorrect use and your negligence.

Warning: Never immerse the product in the rain or any other humid environment to prevent the fire or electric shock.

Safety Precautions:

1. Carefully handle the power cord

Do not damage or deform the power cord, or it will cause the electric shock or abnormal working.

Removing the power cord from the socket, please confirm what you've hold is the socket not the power cord.

2. Never open the cover

Do not open the cover in order to prevent the electric shock. Any problem, please contact us.

3. Never put other things in the product

Do not put the metal in the product and avoid any liquid in, or it will cause electric shock or abnormal working.

Operation Precautions:

1. Care the power cord

When you pull out the plug from the socket, do not pull the power cord but hold the plug.

2. Prevention of the high temperature

Never put the product in the place exposed by the sun or near to the heating equipment.

3. Caution of the rack or chassis installation

Never put this product in a closed rack.

4. Never open the product

It's dangerous to open the product or put your hand in it. If this product has something wrong, pull out the power plug immediately and contact us.

5. Protect the chassis

Avoid spraying insecticides near the product. Do not wipe the product with liquid like gasoline, thinner or other solvents, which easily cause the change of the quality or the color. Use soft cloth to clean it.

6. When you go out

If you don't use this product in a long time, e.g. when you go out for a trip, you must pull out the plug from the power socket.

7. Take care with humidity, water and dust

Do not put this product in the highly humid position or the position with much dust. Do not place vases or something with water in on this product.

8. Please keep the manual well

After reading this instruction, please keep it well. It will be helpful when there are faults.

Attention please. In order to explain clearly to users, the graphic representation in this user's manual may be some different from the real device.

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NOTES:

Product Version : Ver 1.0

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2 X 100WATT CLASS-D AUDIO AMPLIFIER - TK2050 USER'S GUIDE

Chapter 1. Overview

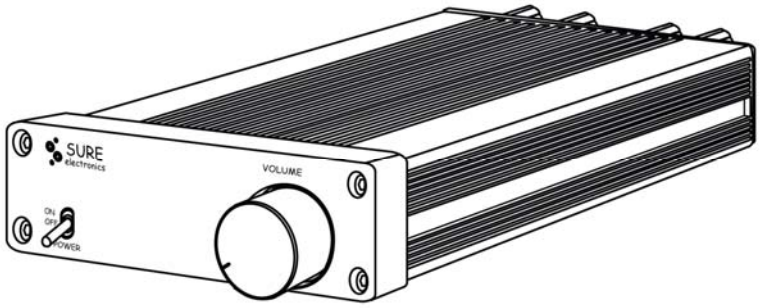
1.1 Overview

Welcome to use this amplifier with aluminum alloy case by Sure Electronics. This product features streamlined frame design, beautiful shape, portable carrying and durable using.

This product supports dual-channel audio amplification with each channel 100W power amplifier output and high fidelity sound output. And in order to ensure perfect sound output, we use high-quality rotary encoder and the volume control chip for volume control. It can ensure the precise adjustment and perfect volume output even after long time use. It has built-in MCU control with over / under voltage, over current protection, and LED indication during working.

Powered by supply from DC 24V, this amplifier can drive 4Ω or 8Ω passive speakers.

FIGURE 1-1 OVERVIEW



1.2 Accessory (Optional purchase)

- 27V 13A DC Switching Power Supply
- 3.5mm to RCA cable
- 5.5mm/2.1mm to 5.5mm/2.5mm tips connector

1.3 Features

- Class-D audio amplifier based on authentic **TK2050** from **Tripath**
- Wide working voltage range: 12 to 32V
- Streamlined aluminum alloy housing makes it more durable
- High-quality digital volume control IC ensures long time use and perfect sound output
- Frequency response: 20Hz to 20KHz (±3dB)
- S/N rate: 100dB (A-weighted)
- High Output Power
  30W @ 6Ω, <1% THD+N
  40W @ 8Ω, <3% THD+N
  100W @ 4Ω, <10% THD+N

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- High Efficiency
  86% @ 60W, 8Ω
  82% @ 46W, 6Ω
  90% @ 100W, 4Ω
- Audiophile Quality Sound
  0.007% THD+N @ 30W 8Ω
  0.005% THD+N @ 70W 4Ω
- Line level and analog audio signal input
- MCU-based backlight of volume control knob-"LED ring", which shows the working status of the product.
- Automatically save volume setting after power off
- Volume Fade-in and fade-out
- Over/under voltage shutdown
- Over current protection
- Over temperature protection

1.4 Applications

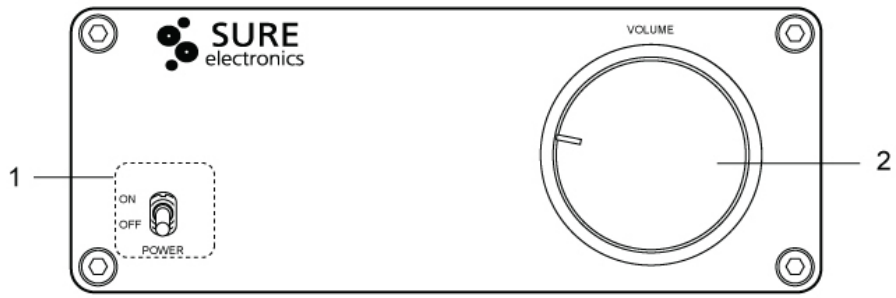
- Background Music Systems
- Interactive kiosks
- Home DIY
- Car audio

1.5 Components and Function

Please refer to the corresponding pages for the detailed information.

1.5.1 Front Panel

FIGURE 1-2 (TOGGLE SWITCH, VOLUME KNOB)



1—toggle switch 2— volume knob

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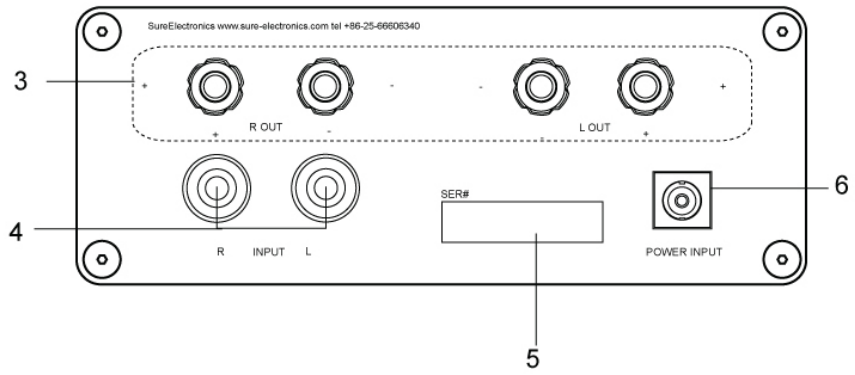
1.5.2 Back Panel

FIGURE 1-3 (POWER INPUT, SPEAKER OUTPUT, AUDIO SIGNAL INPUT)

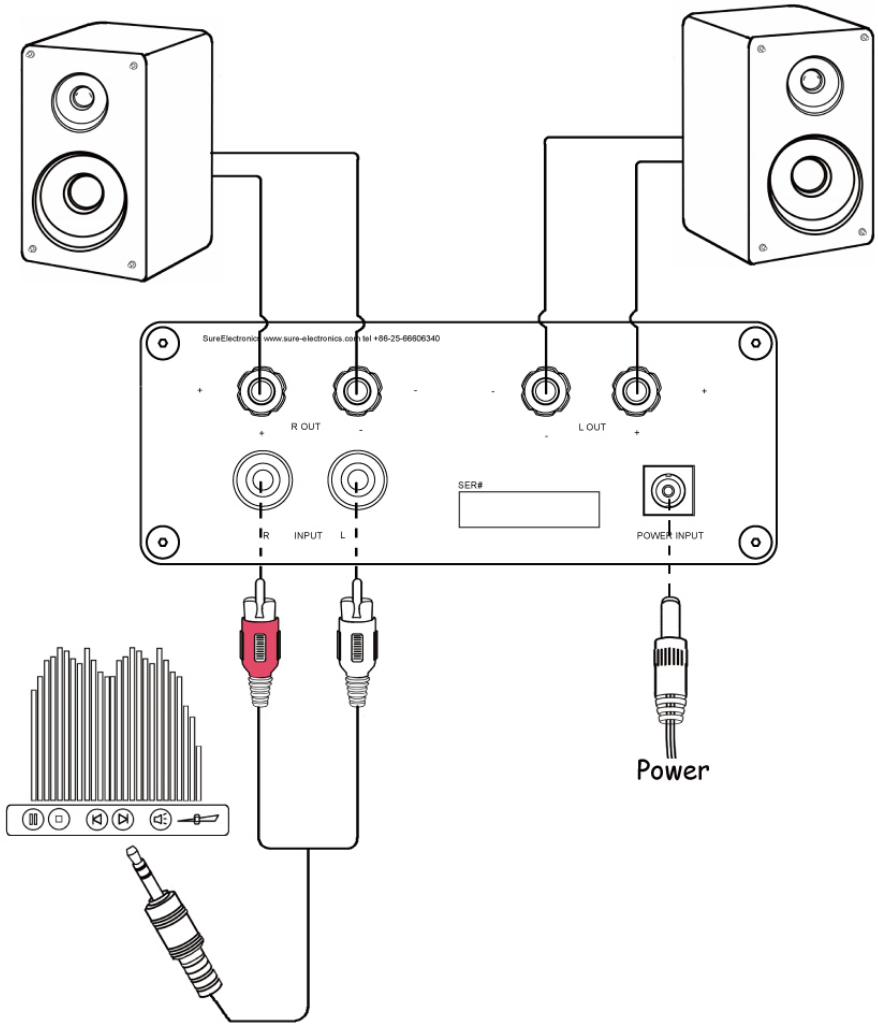


3—speaker output terminal　　4—audio signal input terminal

5—serial number　　6—power input

1.5.3 Connection

FIGURE 1-4 CONNECTING SCHEMATIC



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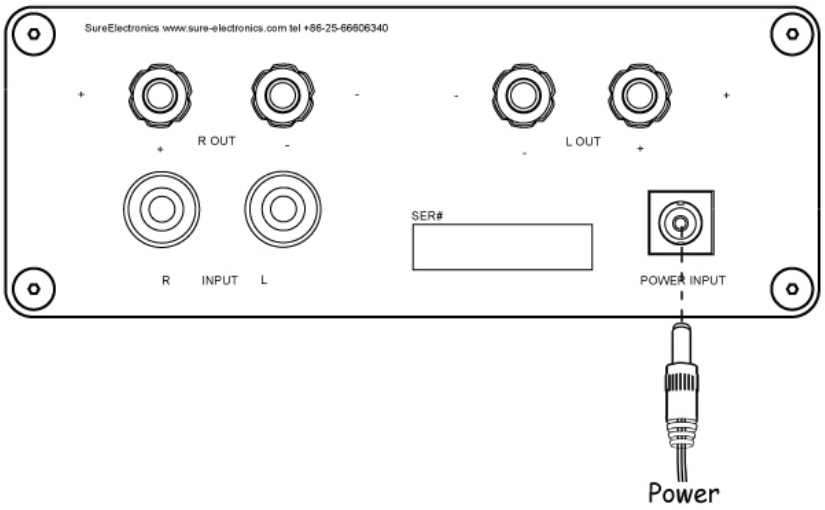
Chapter 2. Hardware Detail

2.1 Power Connection

A high-performance power supply is important for an amplifier to output high-quality sound and work stably. A high-quality power adapter is needed for this amplifier and you can buy one from us. Please connect the power adapter with the audio power amplifier according to the following schematic:

Pay attention to the power adapter when connecting. A 5.5mm/2.5mm power adapter or a 5.5mm/2.1mm to 5.5mm/2.5mm tips connector is needed for connecting.

FIGURE 2-1 POWER CONNECTION SCHEMATIC



2.2 Button Setting

When toggle switch is ON, press the knob and make it between mute disable and enable status.

LED shows breathing-effect light only when mute is enabled.

LED is on for no more than 1 second and then off when volume adjustment is activated while mute is disabled.

When the toggle switch is OFF, the product is in the standby mode, and then LED is off.

FIGURE 2-2 BUTTON SETTING

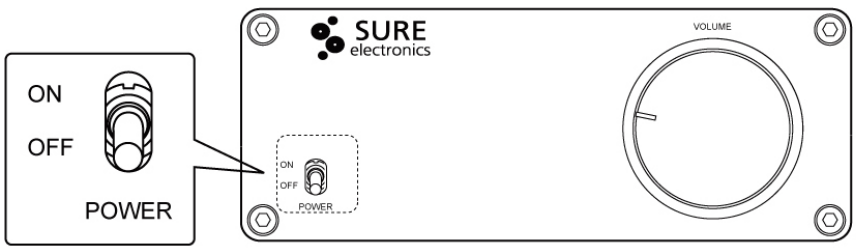


TABLE 2-1 BUTTON FUNCTION

Toggle Switch State	Product State	LED State
ON	Mute enabled	LED lighting in a breathing-effect state
	Mute disabled	LED lighting no more than 1second when volume adjustment is activated
OFF	Standby mode	LED off

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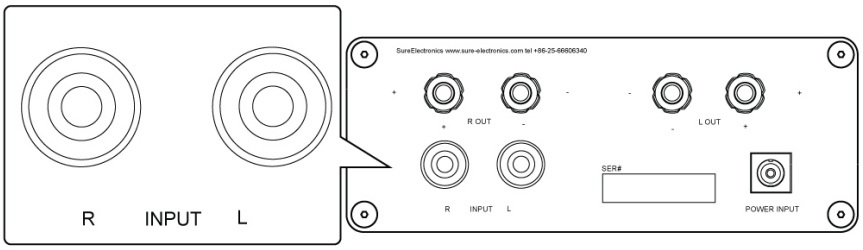
2.3 Input Connection

This product adopts RCA socket to input audio signal. A 3.5mm to RCA cable is needed.

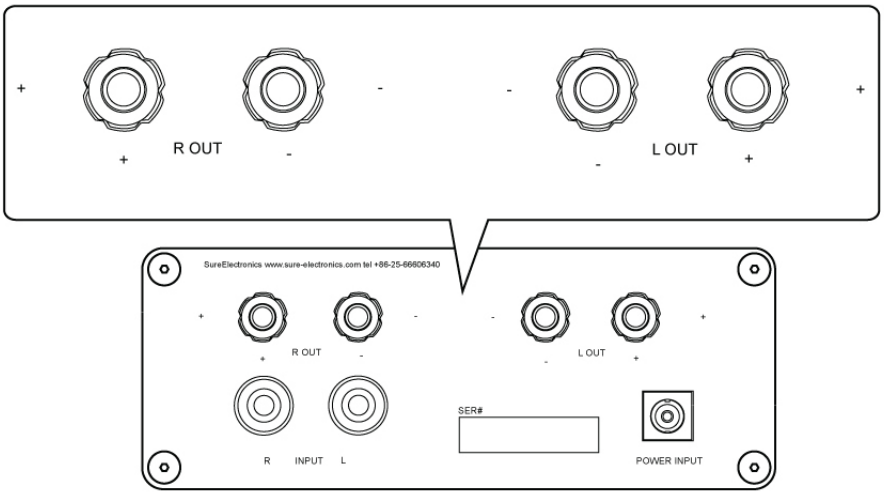
FIGURE 2-3 INPUT CONNECTION



2.4 Output Connection

This product provides dual channel output by using banana jacks. Pay attention that LOUT+ and LOUT- are Left Output Channels, ROUT+ and ROUT- are Right Output Channels.

FIGURE 2-4 OUTPUT CONNECTION

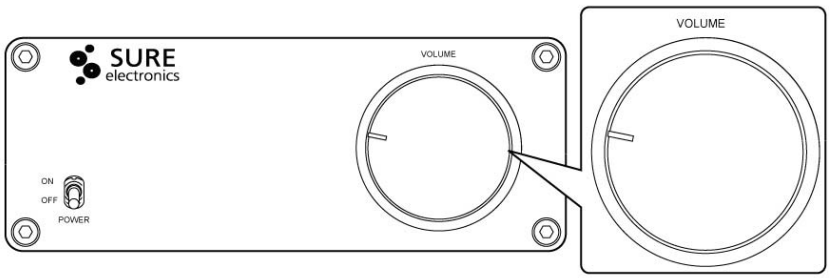


Note: LOUT- and ROUT- are not in the same net and can not be connected together. Moreover, LOUT+, LOUT-, ROUT+, ROUT- can not be connected to the ground

2.5 Volume Control

We adopt a rotary encoder and high quality digital volume control, ensuring high quality signal output and high precision volume adjustment.

FIGURE 2-5 VOLUME CONTROL



2.6 LED Indicators

This product is based on MCU which controls the indicators to display dynamic LED state and make this product more fashionable and attractive. Please refer to table 2-1 for details.

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2.7 Fault Tracing

If the amplifier does not work well, please read the following table 2-3.

TABLE 2-3 CORRECTIVE MAINTENANCE

Situation	Solutions
No sound	1. Check if it is connected with the power and confirm that the voltage regulator works well. If not, connect the power according to the schematics. 2. Check if the signal input cable is connected correctly and if there is signal. If not, connect the lines according to the schematic and input the audio signal. 3. Check if the output cable is damaged and if the speaker works or not. If not, change the output cable and the speaker. 4. Check if toggle switch is on. 5 Check if LED is in a breathing-effect state, if it is, press the volume knob and if not, adjust the volume control.
Suddenly no sound when the product is working	Check if the product has worked for long time or if the audio signal is too high. If it is, turn off the power and turn it on again.

Note: If the problems above still cannot be solved, maybe the product has something wrong. Now please turn off the power, pull out the power cord from the socket and then contact us. Please refer to chapter 5 for our contact information.

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Chapter 3. Electrical Characteristics

Following table lists the typical value of all the parameters. For more details, please refer to the datasheet of TK2050 by Tripath.

TABLE 3-1 BASIC PARAMETERS

Parameter		Condition		Min.	Typ.	Max.
Supply Voltage		-		12V	24V	32V
Shutdown Current*		-		7A	12A	16A
Quiescent Current		Toggle Switch ON, DC24V, No Load	Mute=1	60mA	100mA	130mA
			Mute=0	-	160mA	-
		Toggle Switch Off, DC24V, No Load		-	30mA	-
Signal/Noise Ratio		-		90dB (A-weighted)	100dB (A-weighted)	-
Input Sensitivity		A=0dB		0.720V	0.771V	0.800V
THD+N*		R_L=4Ω, P_{out}=70W		-	0.010%	-
		R_L=8Ω, P_{out}=30W		-	0.007%	-
Frequency Range		-		20Hz to 20KHz（±3dB）		
Efficiency@ VCC=32V		R_L=4Ω, P_{out}=117W			86%	
		R_L=6Ω, P_{out}=46W		-	82%	-
		R_L=8Ω, P_{out}=60W		-	88%	-
Output Power	THD+N<0.01%	R_L=4Ω, f=1000Hz		-	50W	-
		R_L=8Ω, f=1000Hz		-	35W	-
	THD+N<10%	R_L=4Ω, f=1000Hz		-	100W	-
		R_L=8Ω, f=1000Hz		-	60W	-
Input Impedance		-		11K	22K	-
Offset Voltage (adjustable)				-10mV	0mV	10mV
Minimum Load		-		3.2Ω	-	-
Channel Separation*		Po=100W, R_L=4ohm		80dB	95dB	-
Power Gain*		-		14V/V	16V/V	18V/V
Operating Temperature		-		0℃	20℃	50℃
Storage Temperature		-		-20℃	20℃	105℃
Thermal Warning*		-		-	130℃	-
Thermal Shutdown		-		-	150℃	-

Note: Here only list the dB gain of TK2050. *The chip's specifications from Tripath's TK2050 Data Sheet. Some parameters are modified according to the actual operations. The volume control chip can reach a maximum of 11.25dB in preamplification.

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Chapter 4. Mechanical Drawing

FIGURE 4-1 FRONT PANEL

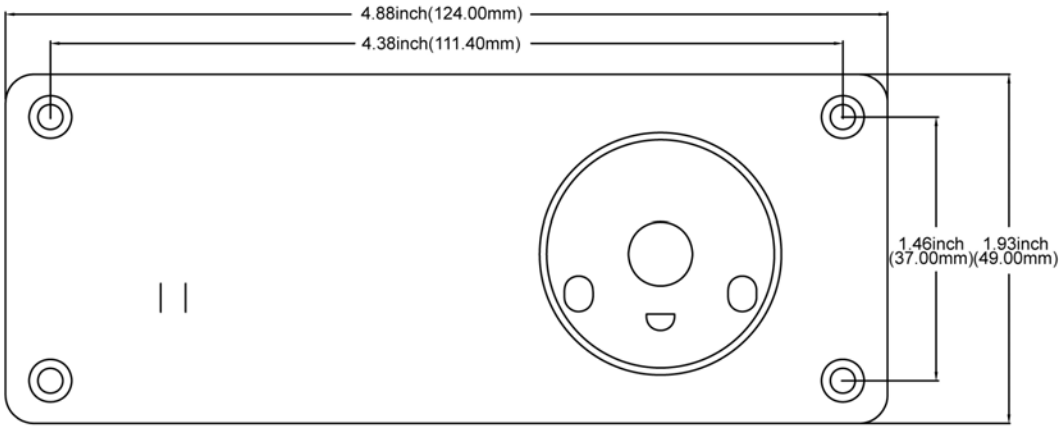
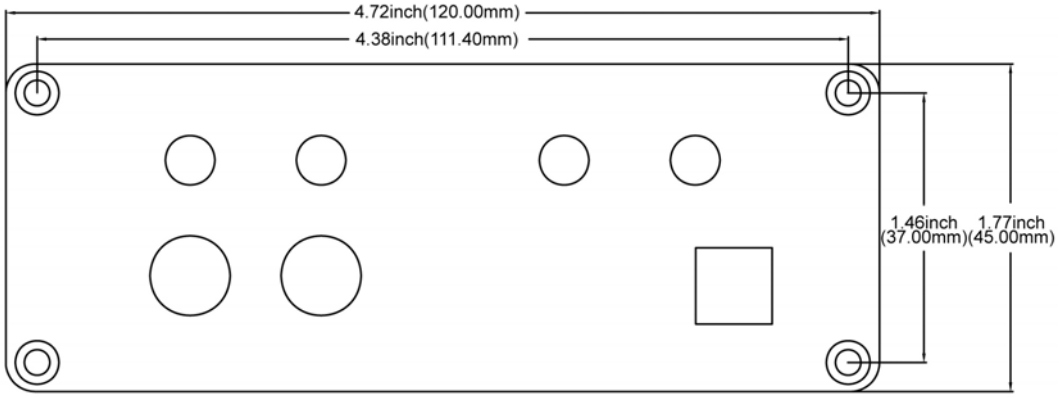


FIGURE 4-1 BACK PANEL



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Chapter 5. Contact Us

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